# PATENT ABSTRACTS OF JAPAN

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## (54) CORROSIONPROOF COATING MATERIAL COMPOSITION

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain the subject composition, capable of manifesting corrosionproof and rust preventing effects for a long period without causing coating film defects such as peeling or cracking even by an instantaneous temperature change and useful for a back surface, etc., of the bottom of a cargo tank for transporting vegetable oils having a high pour point by including a specific amount of a flexible epoxy resin therein.

SOLUTION: This composition is obtained by including a flexible epoxy resin (solid content) (a polyethylene glycol glycidyl ether type, a glycidyl ether type of a bisphenol A alkylene oxide adduct, etc.), in an amount of 1-30 wt.%, preferably 3-25 wt.% based on the total resin solid content and further including a binder and an organic solvent, as necessary, a color pigment, an extender pigment, a suspending agent, an antisagging agent and a cissing preventing agent therein. The resultant composition is capable of providing ≥50°C, preferably ≥70°C Tg after coating and ≥10%, preferably ≥12% elongation of a coating film.

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* NOTICES *



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CLAIMS

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[Claim(s)]
[Claim 1] The anticorrosive-paint constituent characterized by for the flexible epoxy resin (solid content) forming 1 - 30% of the weight of all resin solid content, for Tg of the paint film after paint becoming 50 degrees C or more in an anticorrosive-paint constituent, and the elongation percentage of a paint film becoming 10% or more.

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the anticorrosive-paint constituent which can form an anti-corrosiveness paint film over a long period of time suitable for using for the part which receives a momentary temperature change like the rear face (head-lining side of a ballast tank) of the pars basilaris ossis occipitalis of the cargo tank of a transport ship which carries the high animal and vegetable oils of the pour points, such as hyperviscous C fuel oil and palm oil, especially about an anticorrosive-paint constituent.
[0002]
[Description of the Prior Art] Conventionally, two sorts of tar epoxy-resin-coating JIS or an one-sort equivalent is usually painted by 200-250 micrometers of desiccation thickness in the head-lining side of the ballast tank used as the rear face of the pars basilaris ossis occipitalis of the cargo tank of a transport ship which carries the high animal and vegetable oils of the pour point. Moreover, denaturation epoxy resin coating has also been painted more often by 250-300 micrometers of desiccation thickness recently.
[0003] C fuel oil, palm oil, etc. have high viscosity in ordinary temperature, since it is lacking in a fluidity, they heat those loads in the case of loading and load taking down, they make viscosity low, and, usually improve workability. Although whenever [ stoving temperature ] is about 50-70 degrees C in many cases, it may be made 80 degrees C or more. If such an elevated-temperature object is loaded, it will go up to temperature also with the head-lining side (rear face of the pars basilaris ossis occipitalis of a cargo tank) of a ballast tank comparable as a load. Moreover, although it unloads and seawater is behind poured into a ballast tank, the seawater of winter may be cold and may become 5 degrees C or less. Sudden cooling of the tank is carried out by impregnation of the seawater to this ballast tank.
[0004]
[Problem(s) to be Solved by the Invention] Thus, it loads and unloads, and occasionally the head-lining side of a ballast tank will receive the momentary temperature change in within the limits of 80 to 5 degrees C 5 degrees C or less from 80 degrees C or more, and will be put to the environment where telescopic motion of a paint film is intense by the repeat of the irrigation to a ballast tank. Therefore, in the paint film obtained using the usual coating for ballast tanks, there was a trouble of paint film defects, such as separation and a crack, having arisen at an early stage, and being easy to produce corrosion and generating of rust. This invention solves many above problems and the purpose of this invention is to offer the coating constituent which can form the paint film which covers the bottom of the above environments at a long period of time, and demonstrates corrosion prevention and the rust-proofing effectiveness.
[0005]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, wholeheartedly, as a result of examination, in the anticorrosive-paint constituent, this invention persons blended the flexible epoxy resin in the amount of specification, found out that the above-mentioned purpose was attained by limiting Tg value and the elongation percentage of a paint film after paint to a specific value, and reached this invention. That is, the anticorrosive-paint constituent of this invention is characterized by for the flexible epoxy resin (solid content) forming 1 - 30% of the weight of all resin solid content, for

Tg of the paint film after paint becoming 50 degrees C or more, and the elongation percentage of a paint film becoming 10% or more.

[0006]

[Embodiment of the Invention] Below, the gestalt of operation of this invention is explained at a detail. Although the various epoxy resins of a polyethylene-glycol glycidyl ether mold, a polypropylene-glycol glycidyl ether mold, the glycidyl ether mold of the bisphenol A alkylene oxide addition product, the glycidyl ether mold of the bisphenol A polymerization fatty-acid addition product, and a dimer acid diglycidyl ester mold or two or more sorts of such mixture can mention as a typical thing as a flexible epoxy resin which can be used with the anticorrosive-paint constituent of this invention, it is not limited to these.

[0007] The anticorrosive-paint constituent of this invention contains the above-mentioned flexible epoxy resin as an indispensable component, and contains many components used for the well-known anticorrosive-paint constituent further conventionally by the same blending ratio of coal. The anticorrosive-paint constituent of this invention namely, in addition to the above-mentioned flexible epoxy resin An amine hardening epoxy resin, isocyanate hardening polyol resin, chlorination resin, cumarone indene resin, vinyl chloride resin, xylene resin, ketone resin, petroleum resin, and a bituminous substance like a coal-tar pitch or BOJUNTAN -- or Aromatic hydrocarbon, such as binders, such as two or more sorts of such mixture, a xylene, and toluene, Can contain organic solvents, such as alcohol and a ketone, and the need is accepted further. Various additives, such as extenders, such as color pigments, such as titanium oxide, ferrous oxide, and carbon black, talc, a calcium carbonate, a barium sulfate, and a mica, other suspending agents, an antisagging agent, and a HAJIKI inhibitor, can be contained.

[0008] all the resin solid content in which the flexible epoxy resin (solid content) included this flexible epoxy resin in the anticorrosive-paint constituent of this invention -- 3 - 25 % of the weight is occupied preferably one to 30% of the weight. When the contents of a flexible epoxy resin (solid content) are less than 1% of the weight of all resin solid content, since the target effectiveness becomes inadequate by this invention, it is not desirable. Conversely, since the inclination for a paint film to stop having sufficient physical reinforcement, and to produce a paint film defect will become large if it exceeds 30 % of the weight, it is not desirable.

[0009] Moreover, 50 degree C or more of Tg(s) of the paint film after paint become 70 degrees C or more preferably, and, as for the anticorrosive-paint constituent of this invention, the elongation percentage of a paint film becomes 12% or more preferably 10% or more. When Tg of the paint film after paint is less than 50 degrees C, since there is an inclination for degradation of a paint film to become the bottom of hot environments early, it is not desirable. Moreover, when the elongation percentage of a paint film is less than 10%, since there is an inclination it to become difficult for a paint film to ease the flexible stress by the momentary temperature change, it is not desirable.

[0010] The anticorrosive-paint constituent of this invention may be directly painted on the front face of the steel materials which degreased the front face of for example, shot-blasting steel materials, were made to dry and were obtained on the surface of steel materials, or may paint a shop primer on the surface of steel materials, and may paint it on it. 200-500 micrometers of desiccation thickness, preferably, the anticorrosive-paint constituent of this invention is painted so that it may be set to 250-300 micrometers, and it carries out a forced drying at air drying or the temperature of 100 degrees C or less. The approach currently generally enforced as the method of application which paints the anticorrosive-paint constituent of this invention from the former, such as brush paint, roller painting, an air spray, airless spray, and an electrostatic spray, can adopt as it is.

[0011]

[Example] This invention is not limited by these examples although this invention is further explained below at a detail based on an example and the example of a comparison. It kneaded by the sand mill for 2 hours by the amount (weight section) ratio which showed all components other than the polyamine resin which is a curing agent among the components shown in the after-mentioned table 1, and a polyamide resin component in Table 1, and each compound was prepared. And it mixed by the amount (weight section) ratio which showed polyamine resin or a polyamide resin component to those compounds in Table 1 just before paint, and the anticorrosive-paint constituent of this invention was prepared.

[0012] The front face of shot-blasting steel materials (JIS G 3101, 70x150x3.2mm) was degreased and dried by the xylene. Each coating constituent obtained above on the front face of these steel materials was painted so that it might become 200 micrometers of desiccation thickness with an air spray, and it was made to season naturally for seven days. The thermo-cycle trial and 90-degree-C salt water immersion test were performed by the following approach about the obtained color card.
[0013] To 100 degrees C, the heating rise was carried out and, subsequently to 5-degree C iced water, the front face of a <thermo-cycle trial> paint film was soaked. After repeating this actuation 10 times, the test panel was immersed in the container which filled brine of 3 % of the weight of concentration, and it held at 60 degrees C, and put for one week. This actuation was made into 1 cycle and 15 cycle was operated.
The test panel was immersed into the container which filled brine of 3 % of the weight of <90-degree-C salt water immersion test> concentration, and it held at 90 degrees C, and put for four months.
[0014] The adhesion force of a paint film was measured after the thermo-cycle trial and 90-degree-C salt water immersion test, and the paint film appearance was observed. Furthermore, it asked for the adhesion force decreasing rate of a paint film from the adhesion force of the paint film before these trials, and the adhesion force of the paint film after a trial. These were evaluated based on the valuation basis of the following table 2. The result was as being shown in the following table 3. Moreover, the elongation percentage of each isolation paint film and Tg were measured, and relation with the paint film engine performance has been grasped.
[0015]
[Table 1]

表 1

| 配合原料 | | 実施例 | | 比較例 | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 1 | 2 | 3 | 4 |
| 結合剤 | エポキシ樹脂A 注1) | 8 | 7 | 6 | 8 | 6 | 14 |
| | エポキシ樹脂B 注2) | 8 | 7 | 6 | 8 | 5 | |
| | エポキシ樹脂C 注3) | | | | | | 4 |
| | 石油樹脂 | | | | | | 12 |
| | コールタールピッチ | 19 | 18 | 16 | 20 | 27 | |
| | ポリアミン樹脂 注4) | 4 | 4 | 4 | 4 | | |
| | ポリアミド樹脂A 注5) | | | | | 5 | |
| | ポリアミド樹脂B 注6) | | | | | | 8 |
| | 可撓性エポキシ樹脂 | 5 | 10 | 20 | | | |
| | (全樹脂固形分に対する可撓性エポキシ樹脂の%) | 11.4 | 21.7 | 38.5 | | | |
| その他の原料 | 酸化チタン | | | | | | 4 |
| | タルク | 33 | 32 | 29 | 35 | 22 | 33 |
| | 炭酸カルシウム | | | | | 11 | |
| | 沈殿防止剤 | 3 | 3 | 2 | 3 | 1 | 3 |
| | キシレン | 11 | 11 | 10 | 12 | 18 | 12 |
| | ノルマルブタノール | | | | | | 5 |
| | イソブタノール | 9 | 8 | 7 | 9 | 5 | |
| | トルエン | | | | 1 | | |
| | メチルイソブチルケトン | | | | | | 5 |

注1) エポキシ当量230～270のビスフェノールA型エポキシ樹脂
注2) エポキシ当量450～500のビスフェノールA型エポキシ樹脂
注3) エポキシ当量875～975のビスフェノールA型エポキシ樹脂
注4) アミン価225～265の変性ポリアミン
注5) アミン価235～265の変性ポリアミドアミン
注6) アミン価320～370のポリアミドアミン

[0016]

[Table 2]

表　2

| 評　価 | 付着力(kg/cm²) | 外　観 | 付着力低下率（%） |
|---|---|---|---|
| ◎ | ３０以上 | 異常なし | １５以下 |
| ○ | ２０以上３０未満 | さび１%以下<br>ふくれ１%以下 | １５超　３０以下 |
| △ | １０以上２０未満 | さび３%以下<br>ふくれ３%以下 | ３０超　４５以下 |
| × | ０以上１０未満 | さび３%以上<br>ふくれ３%以上<br>割れ | ４５超 |

[0017]
[Table 3]

表　3

| | | 単離塗膜 | 付着力 | | 外観 | | 付着力低下率 | |
|---|---|---|---|---|---|---|---|---|
| | | 伸び率　Tg | HC | 塩水 | HC | 塩水 | HC | 塩水 |
| 実施例 | 1 | １６．３　１０２ | ◎ | ○ | ◎ | ◎ | ◎ | ○ |
| | 2 | １７．５　９８ | ◎ | ○ | ◎ | ◎ | ◎ | ○ |
| 比較例 | 1 | －　－ | － | － | － | － | － | － |
| | 2 | ８．８　８６ | △ | ○ | ○ | ◎ | △ | ○ |
| | 3 | ２．５　５ | △ | △ | ○ | ○ | × | × |
| | 4 | １１．８　２２ | ○ | △ | ◎ | ○ | ○ | × |

比較例１は、試験不可能であった。
表３中の「HC」はヒートサイクル試験を意味し、
「塩水」は９０℃塩水浸漬試験を意味する。

[0018] The coating constituent of the example 1 which is the anticorrosive-paint constituent of this invention, and an example 2 has the outstanding anti-corrosiveness and endurance like [ it is ****** and ] also from the evaluation result shown in Table 3. On the other hand, the coating constituent of the example 1 of a comparison with which the loadings of a flexible epoxy resin exceed 30% of the weight of all resin solid content has the inadequate physical reinforcement of a paint film, and was not able to bear a thermo-cycle trial and 90-degree-C salt water immersion test. Moreover, the coating constituent of the less than 50-degree C example 3 of a comparison had [ the elongation percentage of a paint film / both thermo-cycle-proof nature and 90 degree-C salt water immersion ] bad Tg of a paint film at less than 10%, and the coating constituent of less than 10% of example 2 of a comparison has [ the elongation percentage of a paint film ] bad thermo-cycle-proof nature, and it was not [ Tg of a paint film brought a result with 90-degree-C salt water immersion nature bad / the coating constituent of the less than 50-degree C example 4 of a comparison /, and ] desirable.
[0019]
[Effect of the Invention] The anticorrosive-paint constituent of this invention is an anticorrosive-paint constituent which can form the paint film which can ease the flexible stress by the temperature change, and continues at a long period of time, and can maintain anti-corrosiveness, and is suitable for painting the part which receives a momentary temperature change.

[Translation done.]